

Figure S1.

**Cytotoxicity of recombinant ribosomal P-protein antigens.** The viability of mouse spleen lymphocytes treated for 24-48h with different concentrations of P0 (A), P1 (B), P2 (C), P0-(P1-P2)<sub>2</sub> (D), and Msp-1<sub>19</sub> (E) was determined with the MTT assay. The results are expressed as the mean  $\pm$  S.E.M. of three independent experiments, each with eight separate cultures. \*-significantly different from the 24h incubation time,  $P \leq 0.01$  (Wilcoxon's signed rank test).

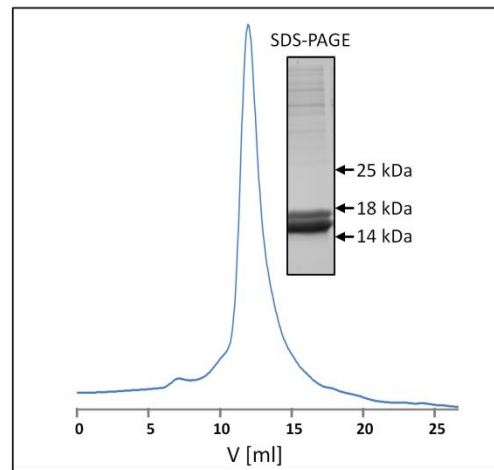


Figure S2.

**Size-exclusion chromatography of the pentameric P-protein complex.** Size-exclusion chromatography was performed using an analytical gel filtration column; the complex was eluted as a single symmetrical peak. Insert; SDS-PAGE analysis of protein fraction isolated from size-exclusion chromatography.

Mice treated with	Th1 versus Tc	
	r	<i>P</i>
P0	0.14	0.57
P1	0.62	0.005
P2	0.69	0.001
P0-(P1-P2) <sub>2</sub>	0.92	0.0003
Msp-1 <sub>19</sub>	0.91	0.0001
adjuvant control mice	0.14	0.58
untreated control mice	0.22	0.41

Table S1.

**Th1 lymphocytes support cellular immune response.** The Spearman correlation between the number of the Th1 and Tc lymphocytes in the peripheral blood of mice immunized with the P0, P1, P2, P0-(P1-P2)<sub>2</sub>, and MSP-1<sub>19</sub> proteins and in the adjuvant control mice as well as the untreated control mice. Each group consisted of eighteen mice. Values of  $P \leq 0.05$  were considered significant.

Protein	CD4+CD25+ versus:				CD4+FoxP3+ versus:			
	Tc		Th1		Tc		Th1	
	r	<i>P</i>	r	<i>P</i>	r	<i>P</i>	r	<i>P</i>
P0	-0.046	0.85	0.13	0.59	0.17	0.49	0.2	0.42
P1	-0.15	0.55	-0.13	0.56	0.31	0.2	0.3	0.22
P2	-0.38	0.11	-0.82	0.00003	-0.63	0.004	-0.68	0.001
P0-(P1-P2) <sub>2</sub>	-0.46	0.053	-0.49	0.039	-0.71	0.0008	-0.65	0.003
Msp1 <sub>19</sub>	-0.43	0.07	-0.054	0.02	-0.56	0.01	-0.48	0.04
adjuvant control mice	0.28	0.24	-0.079	0.75	0.12	0.37	-0.1	0.62
untreated control mice	0.3	0.11	0.1	0.66	0.26	0.21	0.15	0.54

Table S2.

**Regulation of cellular response (blood lymphocytes).** The Spearman correlation between the numbers of CD4+CD25+ or CD4+FoxP3+ versus Tc and Th1 lymphocytes in the peripheral blood of mice immunized with the P0, P1, P2, P0-(P1-P2)<sub>2</sub>, and Msp-1<sub>19</sub> proteins and in the adjuvant control mice as well as the untreated control mice. Correlations were calculated in each study group with eighteen mice. Values of  $P \leq 0.05$  were considered significant.

Protein	CD4+FoxP3+ versus:			
	Tc		Th1	
	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>
P0	0.45	0.22	0.31	0.4
P1	-0.016	0.96	-0.26	0.48
P2	-0.72	0.02	0.38	0.3
P0-(P1-P2) <sub>2</sub>	-0.81	0.007	-0.85	0.003
Msp-1 <sub>19</sub>	-0.76	0.017	-0.4	0.28
adjuvant control mice	0.02	0.94	0.36	0.32
untreated control mice	0.12	0.84	0.22	0.61

Table S3.

**Regulation of cellular response (spleen lymphocytes).** The Spearman correlation between the numbers of CD4+FoxP3+ versus Tc and Th1 lymphocytes in cells isolated from the spleen of mice immunized with the P0, P1, P2, P0-(P1-P2)<sub>2</sub>, and Msp-1<sub>19</sub> proteins and in the adjuvant control mice. Correlations were calculated in each study group with eighteen mice. Values of  $P \leq 0.05$  were considered significant.

Mice treated with	TGF- $\beta$ versus:				IL-10 versus:			
	CD4+CD25+		CD4+FoxP3+		CD4+CD25+		CD4+FoxP3+	
	r	P	r	P	r	P	r	P
P0	-0.2	0.59	0.5	0.07	-	-	-	-
P1	0.35	0.34	0.7	0.01	0.61	0.076	0.81	0.007
P2	0.7	0.03	0.8	0.001	0.44	0.23	0.72	0.025
P0-(P1-P2) <sub>2</sub>	0.82	0.005	0.51	0.01	0.66	0.049	0.5	0.16
Msp-1 <sub>19</sub>	0.88	0.002	0.55	0.05	0.45	0.21	0.55	0.17
adjuvant control mice	-0.15	0.49	0.1	0.61	0.11	0.33	0.2	0.21
untreated control mice	-0.1	0.59	-0.19	0.69	0.17	0.84	0.11	0.66

Table S4.

**Interplay between regulatory blood lymphocytes and TGF- $\beta$  or IL-10.** The Spearman correlation between the numbers of serum TGF- $\beta$  or IL-10 and CD4+CD25+ or CD4+FoxP3+ lymphocytes in the peripheral blood of mice immunized with the P0, P1, P2, P0-(P1-P2)<sub>2</sub>, and Msp-1<sub>19</sub> proteins and in the adjuvant control mice. Correlations were calculated in each study group with eighteen mice. Values of  $P \leq 0.05$  were considered significant.

- the concentrations of circulating IL-10 levels in mice immunized with the P0 protein were below the detection threshold; therefore, calculation of Spearman correlations was not possible

Mice treated with	Th2 versus IL-10	
	r	<i>P</i>
P0	-	-
P1	0.49	0.18
P2	0.65	0.05
P0-(P1-P2) <sub>2</sub>	0.82	0.006
Msp-1 <sub>19</sub>	0.81	0.007
adjuvant control mice	0.15	0.54
untreated control mice	0.21	0.41

Table S5.

**Production of IL-10 is associated with increased Th2 lymphocyte numbers.** The Spearman correlation between the numbers of serum IL-10 and Th2 (CD4+CD30+) lymphocytes in the peripheral blood of mice immunized with the P0, P1, P2, P0-(P1-P2)<sub>2</sub>, and Msp-1<sub>19</sub> proteins and in the adjuvant as well as the untreated control mice. Correlations were calculated in each study group with eighteen mice. Values of  $P \leq 0.05$  were considered significant.

- the concentrations of circulating IL-10 levels in mice immunized with the P0 protein were below the detection threshold; therefore, calculation of Spearman correlations was not possible

Mice treated with	total IgG versus Th2	
	r	<i>P</i>
P0	0.65	0.056
P1	0.37	0.33
P2	0.68	0.04
P0-(P1-P2) <sub>2</sub>	0.91	0.0006
Msp-1 <sub>19</sub>	0.89	0.001
adjuvant control mice	0.21	0.26
untreated control mice	0.2	0.33

Table S6.

**Humoral immune response support.** The Spearman correlation between the IgG levels and the abundance of Th2 lymphocytes in the peripheral blood of mice immunized with the P0, P1, P2, P0-(P1-P2)<sub>2</sub>, and Msp-1<sub>19</sub> proteins. For IgG determination, sera in each mouse group were pooled (n=9). Values of  $P \leq 0.05$  were considered significant.



Mice immunized with	IL-10 versus:			
	total IgG		Th2	
	r	P	r	P
P0	-	-	-	-
P1	0.96	0.0004	0.49	0.18
P2	0.95	0.0006	0.65	0.057
P0-(P1-P2) <sub>2</sub>	0.69	0.037	0.82	0.006
Msp-1 <sub>19</sub>	0.66	0.049	0.82	0.007
adjuvant control mice	0.19	0.29	0.22	0.39
untreated control mice	0.09	0.39	0.28	0.43

Table S7.

**IL-10 promotes humoral response.** The Spearman correlation between IgG levels versus IL-10 serum concentrations and Th2 lymphocyte numbers in the peripheral blood of mice immunized with the P0, P1, P2, P0-(P1-P2)<sub>2</sub>, and MSP-1<sub>19</sub> proteins and in the adjuvant control mice as well as the untreated control mice. For measurements of both IgG and IL-10, sera in each mice group were pooled (n=9). P0 did not induce detectable production of serum IL-10. Values of  $P \leq 0.05$  were considered significant.